# INSECTS OF MICRONESIA
# Diptera: Phoridae

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## INTRODUCTION

G. E. Bohart was the first to report on phorids of Micronesia. In his study on the Phoridae of Guam [1947, U. S. Nat. Mus., Proc. **96** (3205): 397-416, figs. 33-48] he dealt with five genera and 11 species; one genus (*Parafannia* Bohart) and nine species were described as new. C. N. Colyer [1957, Hawaiian Ent. Soc., Proc. **16** (2): 232] synonymized *Parafannia* Bohart with *Gymnoptera* Lioy. In our recent study on the Phoridae of Hawaii (Insects of Hawaii **11**, 1964) D. E. Hardy and I recognize *Megaselia stuntzi* Bohart as a synonym of *M. setaria* (Malloch). In this present study, *Puliciphora nigriventris* Bohart is shown to be a synonym of *P. pulex* Dahl.

Bohart's descriptions of his new species are inadequate and not always based upon the most reliable characters; the illustrations are sometimes inaccurate. I am unable, therefore, to include *Chonocephalus* species in this study. In the Micronesian material before me, three members of this genus are represented; none of these can, however, be identified as any of Bohart's species. *Megaselia setifemur* Bohart, which also needs redescription, is not represented in this material.

At present, seven genera, two subgenera, and 24 named species of Phoridae, including the two species of *Chonocephalus*, are known to occur in Micronesia. Ten species are new to science, one tribe (Beckerinini) and five species are recorded for the first time in Micronesia.

When considering the Micronesian phorid genera, it is evident that only genera of worldwide distribution are represented. On the other hand, the absence of some other genera widely distributed in Oriental and Pacific regions (for example, *Conicera* Meigen, *Stichillus* Enderlein of the Phorinae, *Phalacrotophora* Enderlein of the Metopininae) is fairly striking.

No definite decision can be made as to the endemic character of the Micronesian species. Two of the species, *Diplonevra cornuta* and *Megaselia scalaris*, are cosmopolitan. *Diplonevra peregrina* is known in nearly all of eastern Asia, and in Pacific and Australian regions. *Megaselia setaria*, *Puliciphora*

Distribution of Micronesian Phoridae

| | MICRONESIAN ISLAND GROUPS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Caroline | | | | | | | | | |
| | Bonin | Volcano | N. Mariana | S. Mariana | Palau | Yap | Caroline Atolls | Truk | Ponape | Kusaie | Marcus-Wake | Marshall | Gilbert | Other Localities |
| 1. Diplonevra cornuta | × | | | × | | × | | × | | × | | × | × | Almost worldwide |
| 2. D. peregrina | × | | | | | | | | | | | | | Japan, Taiwan, Canton, Sumatra, Java, Hawaii |
| 3. Gymnoptera molluscovora | | | | × | | × | | | | | | × | | |
| 4. Megaselia setaria | × | | | × | × | | | | × | | | | | Hawaii |
| 5. M. chrysophora* | | | | | × | | | | | | | | | |
| 6. M. parabasiseta | | | | × | × | | | | | | | | | |
| 7. M. seiuncta* | | | | | × | | | | × | | | | | |
| 8. M. micronesiae* | | | | × | × | | | | | | | | | |
| 9. M. boninensis* | × | | | | | | | | | | | | | |
| 10. M. setifemur | | | | × | | | | | | | | | | |
| 11. M. tenebricior* | | | | | × | | | | | | | | | |
| 12. M. scalaris | × | | | × | × | | | | | | | × | | Almost worldwide, preferring tropical and subtropical regions |
| 13. M. curtissima* | | | | | × | × | | | | | | | | |
| 14. M. tetricifrons* | × | | | | | | | | | | | | | |
| 15. M. suis | | | | × | | | | × | × | | | | | |
| 16. M. heterochaeta* | | | | | | | | | × | × | | | | |
| 17. M. palpella* | | | | | × | | | | | | | | | |
| 18. M. gressitti* | | | | | | × | | | | | | | | |
| 19. Metopina ventralis | | | | | | | | | × | | | | | Bismarck Archipelago, Hawaii |
| 20. Puliciphora pulex | | | | | × | | | | | × | | | | Bismarck Archipelago, Sumatra |
| 21. P. lucifera | | | | | | | | | × | × | | × | | Bismarck Archipelago, Fiji, Samoa, Hawaii |
| 22. P. pallicauda | | | | | × | | | | | | | | | Java |
| 23. P. wymani | | | | × | | × | | | | | | | | Hawaii |
| 24. Chonocephalus hirsutus | | | | × | | | | | | | | | | |
| 25. C. subglaber | | | | × | | | | | | | | | | |

* Described as new.

*wymani*, *P. lucifera* and *Metopina ventralis* are found in Hawaii, the latter two species being originally described from the Bismarck Archipelago. *Puliciphora pulex* is known from the Bismarcks and Sumatra, *P. pallicauda* from Java.

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This study is based upon material collected by P. A. Adams, G. E. Bohart, C. F. Clagg, J. F. G. Clarke, H. S. Dybas, J. L. Gressitt, N. L. H. Krauss, C. W. Sabrosky, F. M. Snyder, O. H. Swezey, and L. D. Tuthill. I am indebted to D. Elmo Hardy, Honolulu, for sending me paratypes of *Megaselia suis* Bohart, and to R. L. Coe, British Museum (Natural History), London, for lending me a paratype of *Megaselia basiseta* Malloch.

The following symbols are used to designate institutions in which specimens are deposited: Bishop Museum (BISHOP), Chicago Natural History Museum (CM), and United States National Museum (US).

## SYSTEMATICS

### Key to Micronesian Subfamilies, Genera, and Subgenera

1. Mid tibia with at least two bristles near base; supra-antennal bristles reclinate (Phorinae) .......... 2
   None of the tibiae clothed with bristles (Metopininae) .......... 4

2(1). Radial sector forked (*Diplonevra*) .......... 3
   Radial sector unbranched .......... **Gymnoptera**

3(2). Mesopleura hairy; hind tibia with only palisadelike row of hairs dorsally .......... subgenus **Dohrniphora**
   Mesopleura bare; hind tibia with two dorsal rows .......... subgenus **Diplonevra**

4(1). Apterous (females only) .......... 5
   Winged .......... 6

5(4). Head strongly produced; supra-antennal bristles absent .......... **Chonocephalus**
   Head not flattened or projected; supra-antennals present .......... **Puliciphora**

6(4). Supra-antennal bristles reclinate .......... **Beckerina**
   Supra-antennals proclinate or absent .......... 7

7(6). Radial sector branched (genus *Megaselia*) .......... 8
   Radial sector simple, unforked .......... 9

8(7). Mesopleura hairy .......... subgenus **Aphiochaeta**
   Mesopleura bare .......... subgenus **Megaselia**

9(7). Veins $M_2$ and $M_4$ straight or slightly bent, not strongly curved together .......... 10
   Vein $M_2$ bent downward and $M_4$ bent upward so cell $M_2$ is hourglass-shaped; anterolateral bristles lacking .......... **Metopina**

10(9). Vein $R_1$ incomplete, obsolete near wing margin; base of $M_1$ lacking; supra-antennals absent (males) .......... **Chonocephalus**
   Veins $R_1$ and $M_1$ present and complete; four supra-antennal bristles present .......... 11

11(10). Hind tibia with a dorsal hair seam and with posterodorsal cilia........................................................ subgenus **Megaselia,** in part
Hind tibia without dorsal hair seam or posterodorsal cilia (males)......**Puliciphora**

### SUBFAMILY PHORINAE

### Genus **Diplonevra** Lioy

*Diplonevra* Lioy, 1864, Istit. Veneto Sci., Atti III, **10**:77 (type species; *Phora florea* Fabricius, Europe).

### Subgenus **Dohrniphora** Dahl

*Dohrniphora* Dahl, 1898, Sitz. Ber. Ges. Nat. Fr. **10**:188 (type species: *Dohrniphora dohrni* Dahl, Melanesia).—Schmitz, 1949, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**:205.

1. **Diplonevra (Dohrniphora) cornuta** (Bigot).

*Phora cornuta* Bigot, 1857, *In* de la Sagra, Hist. Phys. Pol. et Nat., Cuba, 827.—Schmitz, 1951, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**: 241 (type, Cuba, in Mus. Nat. Hist. Nat. Paris).

*Phora navigans* Frauenfeld, 1867, Zool. Bot. Ges. Wien, Verhandl. **17**:454.

*Phora cleghorni* Bigot, 1890, Indian Mus., Notes **1** (4): 191.

*Phora venusta* Coquillett, 1895, Canadian Ent. **27**: 107.

*Phora divaricata* Aldrich, 1896, Ent. Soc. London, Trans. **3**: 437.

*Phora chlorogastra* Becker, 1901, Zool. Bot. Ges. Wien, Abhandl. **1**: 32.

? *Phora divaricata* Aldrich var. *perplexa* Brues, 1903, Am. Ent. Soc., Trans. **29**: 350.

*Dohrniphora divaricata* Aldrich var. *basalis* Santos, 1911, Ci. Art. Barcelona, Mem. **3** (17): 11.

*Dohrniphora divaricata* Aldrich var. *obscura* Santos, ibid.

*Phora mordax* Brues, 1911, Mus. Nat. Hungarici, Ann. **9**: 531.

*Dohrniphora bequaerti* Schmitz, 1914, Nat. Hist. Gen. Limburg, Jaarb., 105.

*Apocephalus flaviventris* Silva, 1916, Mus. Nac. Chile, Bol. **9**: 15.

DISTRIBUTION: Cosmopolitan.

BONIN IS. CHICHI JIMA: Five males, female, Miyanohama, "Jack Wm.'s Beach," Apr. 1958; two males, female, Okumura, "Yankee Town," Apr. 1958; male, Omura, "Camp Beach," Apr. 1958; all by Snyder.

S. MARIANA IS. SAIPAN: Two females, As Mahetog area, Mar. 1945, on *Pandanus,* Dybas. GUAM: Female, Nimitz Hill, May 1956, light trap, Clagg.

PALAU. BABELTHUAP: Female, six males, Airai, Ngerimal R., May

1957, Sabrosky; five males, Ngaremlengui, June 1957, Sabrosky; male, Ngarmalk (N. W. Auluptagel), 25 m., Dec. 1952, Gressitt. KOROR: Male, Apr. 1954, Beardsley; four males, Apr. 1957, Sabrosky; male, July 1956, McDaniels; four males, at light, May, June 1953, Beardsley.

YAP. YAP: Female, Gagil Distr., July-Aug. 1950, Goss; three males, hill behind Yaptown, Berlese funnel and light trap, Nov. 1952, Gressitt; male, Kolonia, June 1957, Sabrosky; three males, hill behind Yaptown, 50 m., Berlese funnel and light trap, Nov. 1952, Gressitt; Kolonia, June 1957, Sabrosky; female, Giliman, June 1957, Sabrosky. GAGIL: Female, July-Aug. 1950, Goss. MAP: Female, Chol, June 1957, Sabrosky.

TRUK. TON (Tol): Male, Mt. Unibot, 200 m., Dec. 1952, light trap, Gressitt.

KUSAIE. Male, Weye Cave, 1 m., Mar. 1953, light trap, Clarke.

MARSHALL IS. ENIWETOK: Three males, Jobtan (Japton) I., Aug. 1956, at light, Tuthill. LAE: Lae I., Oct. 1953, Beardsley.

GILBERT IS. TARAWA: Male, Bairiki I., Nov. 1957, Krauss.

*D. cornuta,* which was recorded from Guam by Bohart (1947) is not easily separated from its congeners, but in Micronesia it is the only species of the subgenus *Dohrniphora* Dahl.

### Subgenus **Diplonevra** Lioy

*Diplonevra* Lioy, 1864, Istit. Veneto Sci., Atti III, **10**: 77 (type species: *Phora florea* Fabricius, Europe).—Schmitz, 1949, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**: 205.

*Phorynchus* Brunetti, 1912, Indian Mus., Rec. **7**: 445.

*Pentagynoplax* Enderlein, 1924, Ent. Mitteil. **13**: 237.

2. **Diplonevra (Diplonevra) peregrina** (Wiedemann).

*Trineura peregrina* Wiedemann, 1830, Aussereur. Zweifl. Ins. **2**: 600 (type, China, Canton; location unknown).

*Phora sinensis* Schiner, 1868, Reise Novara, Diptera, 223.

*Phora conventa* Brues, 1911, Mus. Nat. Hungarici, Ann. **9**: 537.

*Dohrniphora setitibia* Malloch, 1925, Linn. Soc. N. S. Wales, Proc. **1** (4): 333.

DISTRIBUTION: Widespread throughout east Asia, southwest Pacific, and New South Wales; Japan, Taiwan, China (Canton), Sumatra, Java, Hawaii, Bonin Is.

BONIN IS. CHICHI JIMA: Female, Omura, "Camp Beach," Apr. 1958, Snyder.

*D. peregrina,* which is easily distinguished from other Micronesian phorids by the characters in the key, was thoroughly redescribed by Schmitz (op. cit., p. 233). It was hitherto unrecorded from Micronesia.

Genus **Gymnoptera** Lioy

*Gymnoptera* Lioy, 1864, Istit. Veneto Sci., Atti III, **10**: 79 (type species: *Phora vitripennis* Meigen, Europe).—Schmitz, 1949, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**: 300.

*Parafannia* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205): 413.

3. **Gymnoptera molluscovora** (Bohart) (fig. 1).

*Parafannia molluscovora* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205): 414, fig. 46 (type, Guam, in U. S. Nat. Mus.).

DISTRIBUTION: S. Mariana Is., Caroline Is., Marshall Is.

S. MARIANA IS. GUAM: Point Oca, Agana, June 1945 (after Bohart).

YAP. YAP: Allotype, male (US 67398), Gagil, Gachapar, June 19, 1957, Sabrosky.

MARSHALL IS. JALUIT: Female, Jabor I., fly trap, ex carrion dung, May 1958, Gressitt.

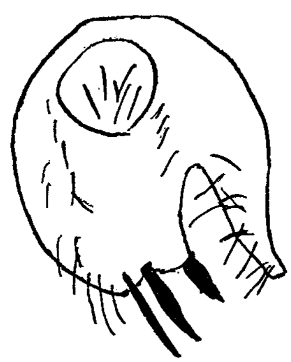


FIGURE 1.—*Gymnoptera molluscovora,* allotype, male genitalia.

Colyer (1951), when making observations on the genus *Gymnoptera* Lioy, stated the correct generic position and compared *molluscovora* with the other species known at that time. Recently Borgmeier has described another species, *G. neotropica* Borgmeier [1958, Studia Ent. **1** (3-4): 305], from Brazil.

I have examined two female paratypes in alcohol, sent me for study by Dr. D. Elmo Hardy, Honolulu. In the collection at hand are another female and a male; the latter I select as the allotype male. A ventral view of the characteristic hypopygium is illustrated in figure 1.

## SUBFAMILY METOPININAE

### TRIBE BECKERININI

### Genus **Beckerina** Malloch

*Beckerina* Malloch, 1910, Scot. Nat. Hist., Ann., 90 (type species: *Phora umbrimargo* Becker, Europe).—Schmitz, 1956, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**: 376.

**Beckerina** sp. ?

DISTRIBUTION: Bonin Is.

BONIN IS. CHICHI JIMA: Ototo Jima, Kammuri-iwa (S.W. Bay), June 1958, Snyder.

One male specimen in very poor condition has to remain undescribed until additional, better preserved material is collected. The species evidently has all the characters of *Beckerina* Malloch, except that the radial sector is not forked. The absence of the radial fork is not, however, of supraspecific value, as there are many other phorid genera (for example: *Borophaga, Diplonevra, Metopina,* and *Megaselia*) which have the radius partly forked. Moreover, there are sometimes transitions in this respect, as in *Borophaga irregularis* (Wood) and *Chaetopleurophora semifurcata* (Borgmeier).

Besides the new species there is only one member of the tribe Beckerinini which has the radial vein unbranched: *Distichophora crassimana* Schmitz from New Zealand; *Distichophora* has, however, two longitudinal hair seams on the dorsal surface of hind tibiae.

### TRIBE METOPININI

### Genus **Megaselia** Rondani

*Megaselia* Rondani, 1856, Dipt. Ital., Prodr. **1**: 137 (type species: *Megaselia crassineura* Rondani, synonym of *Phora costalis* v. Roser, Europe).

#### KEY TO MICRONESIAN SPECIES OF MEGASELIA

| | | |
|---|---|---|
| 1. | Mesopleura hairy (subgenus *Aphiochaeta*) | 2 |
| | Mesopleura bare (subgenus *Megaselia*) | 4 |
| 2(1). | Four scutellar bristles | **4. setaria** |
| | Only two scutellars | 3 |
| 3(2). | Thorax yellow | **5. chrysophora** |
| | Thorax blackish brown | **6. parabasiseta** |
| 4(1). | Radial sector unforked | 5 |
| | Radial sector forked | 6 |
| 5(4). | Thorax yellow; first costal section much longer than second | **8. micronesiae** |
| | Thorax dark; costal sections subequal | **7. sejuncta** |
| 6(4). | Costal cilia long | sp. no. 1 |
| | Costal cilia short, sometimes extremely minute | 7 |
| 7(6). | Thorax black | 8 |
| | Thorax yellowish | 10 |

8(7). Halteres black; venter pale testaceous ........ **10. setifemur**
Halteres yellow ........ 9
9(8). Costa short of middle; anal angle of wing flat (fig. 5) ........ **11. tenebricior**
Costa extending to middle of wing; anal angle of wing normally protruding (fig. 4, *c*) ........ **9. boninensis**
10(7). Anal angle of wing normally protruding ........ 11
Anal angle of wing flattened ........ 12
11(10). Four scutellars in female; two pairs of equal supra-antennals ........ **12. scalaris**
One pair of scutellars in female; lower postantennals very short; male palpi almost bare ........ **17. palpella**
12(10). Costal cilia extremely minute (fig. 6, *a*); antennae black, female with anterior scutellars bristlelike ........ **13. curtissima**
Costal cilia not extremely short, if rather short (in *gressitti*), the antennae yellow; both sexes with only two scutellars ........ 13
13(12). Frons and antennae entirely black; vein $M_1$ with a slight S-like bend at base (fig. 7, *a*) ........ **14. tetricifrons**
Frons and antennae yellowish ........ 14
14(13). Males ........ 15
Females ........ 17
15(14). Hypopygium (fig. 9, *a*) with a distinct bristle at each side, one on right much more conspicuous than that on left ........ **16. heterochaeta**
Hypopygium without conspicuous bristles ........ 16
16(15). Anal tube slender, epandrium shaped as in figure 8, *c* ........ **15. suis**
Anal tube a bit concise, epandrium formed as in figure 11, *b* ........ **18. gressitti**
17(14). Tergites 3 to 6 reduced in breadth (fig. 8, *b*) ........ **15. suis**
None of the abdominal tergites reduced ........ **18. gressitti** and **16. heterochaeta**

## Subgenus **Aphiochaeta** Brues

*Aphiochaeta* Brues, 1904, Am. Ent. Soc., Trans. **29**: 337 (type species: *Phora nigriceps* Loew, North America).—Schmitz, 1956, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**: 388.

*Mallochina* Schmitz, 1918, Nat. Hist. Gen. Limburg, Jaarb. (1917), 21.

*Pogonopleura* Enderlein, 1924, Ent. Mitteil. **13**: 275.

*Stirocnemia* Enderlein, 1927, Stett. Ent. Zeitung **88**: 109.

### 4. **Megaselia (Aphiochaeta) setaria** (Malloch).

*Aphiochaeta setaria* Malloch, 1912, U. S. Nat. Mus., Proc. **43**: 514 (type, Maui, Hawaiian Is., in U. S. National Museum).

*Megaselia stuntzi* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205): 402, fig. 35 (type, Guam, in U. S. National Museum). Synonymy by Hardy and Beyer (Insects of Hawaii **11**: 276, 1964).

*Male:* Front quadrate, as high as broad, 0.256 mm.; anterior margin of front not strongly convex, sides parallel; frontal surface blackish brown, sometimes entirely yellow, rather dull; ocellar triangle mostly black, seldom partly lighter. Median furrow distinct, yellow, sometimes shining; fine hairs densely arranged and numerous, their basal dots scarcely visible. Two subequal pairs of supra-antennal bristles, upper pair separated by one-fourth width of front, lower pair even more closer together and a little smaller. First row of four reclinate bristles slightly bent downward medially, antial bristles inclined to each other, but not strictly convergent, midway between eye and upper postantennals. Antero-

lateral bristle set close to eye margin. Four preocellar bristles practically equidistant, forming a line that is but slightly convex anteriorly, middle pair a bit farther apart from each other than upper supra-antennals. Antennal segment 3 of normal size, but considerably smaller than in *sextaperta* male, globular without apex, reddish brown. Arista dorsally inserted, about 1.5 times height of front (very difficult to distinguish, compare descriptions and figures 8, *b* and 11, *a*), 0.37 mm. long, moderately pubescent. Palpi not small, deep to bright yellow; distal halves of ventral margin beset with about six relatively small bristles, but not so short as in *sextaperta;* these bristles gradually become a little longer toward apex. Mouth parts not prominent.

Thorax with pleura and scutellum yellow, sometimes entirely dark brown, mesonotum not as pale as pleura, scarcely reflecting. No bristles between two dorsocentrals. Scutellum with four subequal bristles. Propleura with about three bristles along lower edge, and regularly covered with small, fine hairs. Mesopleura hairy, without any isolated bristles.

Wing membrane rather grayish-tinged, but not so fumose as in *parabasiseta.* Length 1.38 mm., maximum width 0.61 mm. Costa not thickened, short to middle (index 0.47-0.48). Ratios of costal sections 1 to 3, 17:12:6. Cilia short, 0.061 mm.; in marginal series, 10 setulae belong to first, 8 to second and third sections. Fork of radial sector rather small, a bit acute-angled. Vein $M_1$ arising at fork, without any S-curve, fairly well curved at beginning, not recurved distally. Vein $M_2$ faintly sinuous. Ratios of distances of extreme tips of veins $M_1$, $M_2$, $M_4$ and An: 15.5:29:24. Anal vein well pigmented. Anal angle normally protruding. Halteres with stem dark, knob yellow.

Legs, including all coxae, yellow, hind femora darkened at apex. Fore tarsi slender, tapering toward apex. Hind femora without any fringe or excavation, proximal half of ventral margin set with about five moderate bristles. Hind tibiae with dorsal hair seam straight. Posterodorsal cilia distinctly developed on distal two-thirds, not very thin but rather short.

Abdomen widest at end of segment 2; first half of segment mostly yellow, second half and tergites 2 to 6 black, all with a narrow yellowish hind margin. Tergite 1 short, 2 as long as usual, 3 to 5 gradually becoming shorter, 6 about as long as 2. Tergal plates sparsely covered with minute hairs, which are longer and almost bristlelike at sides of tergite 2 and along hind margin of tergite 6. Hypopygium medium-sized, knoblike, epandrium blackish brown, dull, when seen from the right side, projected downward and backward, and only this knoblike projection covered with hairs; these hairs stiff though not bristlelike, not short, all of equal length. Anal tube yellow, quite short, end hairs scarcely differentiated. Ventral plate large.

*Female:* Essentially like male except for sexual differences. Abdomen: tergites 3 to 5 not longer than 2, tergite 6 with a faint median line, not really impressed. Venter yellowish, hairy at least beyond segment 2. Terminal segments not heavily chitinized.

Length of body: 1.5-2.4 mm.

DISTRIBUTION: Bonin Is., S. Mariana Is., Caroline Is.; Hawaii.

BONIN IS. Chichi Jima: Three females, Omura, "Camp Beach," Apr. 1958; Miyanohama, male, "Jack Wm's Beach," Apr. 1958; all Snyder.

S. MARIANA IS. Saipan: Male, Mt. Tagpochau, 375 m., Feb. 1945, Dybas. Guam: Male, Nimitz Hill, May 1956, light trap, Clagg.

PALAU. Babelthuap: Female, Ngaremlengui, June 1957, Sabrosky. Koror: 2 males, 10 females, Apr.-May 1957, some on decaying African snail, Sabrosky, Beardsley.

PONAPE. Female, Madolenihm (Metalanim) Plantation, June-Sept. 1950, Adams.

The male of this species fits the main points of the description of *M. sextaperta* Beyer from upper Burma [Biol. Soc. Sci. Fenn. Comm. **18** (8): 52].

A paratype of *sextaperta* in my collection shows the following structural differences: front clearly broader than high; antennae relatively larger; bristles of palpi shorter; sides of abdominal tergites 2 to 6 covered with bristlelike hairs; lower portion of epandrium densely beset with many long, apically curved, bristlelike hairs; end hairs of anal tube longer and thicker than in *setaria*. Female of *sextaperta* has preabdominal tergite 6 distinctly divided into halves; in the *setaria* female there is but a very faint longitudinal suture on tergite 6. Beside *sextaperta* there seems to be a new species allied to *setaria*.

### 5. **Megaselia (Aphiochaeta) chrysophora** Beyer, n. sp.

*Female:* Front well projected anteriorly, sides parallel, median length almost equal to width, in type 0.224 mm.; surface entirely dull reddish brown. Ocellar tubercle well raised, of same color as rest of front, ocelli red. Median impressed furrow faintly developed; fine hairs a bit more dense than usual, but nevertheless quite inconspicuous. Frontal bristles of normal length, red, not black. Four equal postantennals, upper pair occupying two-sevenths width of front, lower ones, which stand on median frontal projection, set closer together. First transverse row of four reclinate bristles well convex anteriorly, antials rather near anterolaterals, which stand quite close to eye; antial bristles on a slightly higher level than upper supra-antennals and four times nearer to inner eye margin than to median line. Second transverse row practically straight, its bristles equidistant, innermost ones (preocellars) placed a little farther away from each other than upper supra-antennals. Mediolateral bristle midway between first and third laterals. Antennal segment 3 slightly smaller than normal size, globular, with a faint apex, reddish brown. Arista dorsal, one and four-sevenths longer than front height (0.35 mm.), rather long pubescent. Palpi bright yellow, nowhere darker, of usual shape and size, distal two-thirds of ventral edge are beset with five moderate bristles arranged in two rows; two of these bristles (second and fourth) belong to inner series, remaining ones to outer row. End bristle scarcely differentiated.

Thorax with pleura and scutellum yellowish; mesonotum not reflecting. Scutellum with two bristles. Propleura with two small bristles at lower margin, one equally weak (or even weaker) bristle near lower hind corner, two bristlelike hairs below prothoracic stigma. Mesopleura with about seven hairs, one of which (and, less distinctly, a second one) a little longer and thicker than remainder.

Wings are rather damaged in two specimens before me. Membrane faintly tinged with gray; heavy veins yellow. Length about 1.17 mm., greatest width 0.54 mm. Costa on whole a bit thicker than usual, clearly short to middle, index 0.42; ratios of costal sections 14:7:5, thus section 1 exactly twice section 2 and noticeably longer than 2 plus 3. Costal cilia short, 0.052 mm., about 15 in each row, five or six on sections 2 and 3. Fork small and acute-angled. Vein $M_1$ arising at fork, extreme basal portion very faint and a little less bent than remaining part, which is evenly and rather strongly convex anteriorly, thus vein $M_1$ bent exactly as in *M. lalunensis* Brues [Am. Acad. Arts Sci., Proc. **70** (9): 392, fig. 6] except that extreme base is very slightly hooklike. Anal vein faintly pigmented, angle protruding. Halteres light yellow.

Legs, including all coxae, pale yellowish; hind femora not darkened at apex. Fore tibiae without any isolated cilia. Fore tarsi slender. Hind femora broadened to a normal degree, widest near middle, 0.54 mm. long, about 0.18 mm. broad. No basiventral excavation or fringe, but with usual row of apically curved hairs (eight, in this species); these are dense, short, and weak, only 0.042 mm. in length. Hind tibiae distinctly compressed, thus resembling some species, mostly European, of *Plastophora* Brues [cf. Colyer, Brotéria, sér. ci. nat. **26** (2): 84]. Dorsal hair seam straight and complete. Posterodorsal cilia very weak, only visible in distal two-thirds of tibia.

Abdomen orange yellow on dorsum, more brownish in paratype specimen; widest at

segment 2, tapering behind, with 6 tergal plates, none of which is modified. All tergites uniformly colored, without any hind bands, dull. Plates almost bare except at sides and along hind margins. Tergite 2 without a lateral tuft of bristles. Venter pale yellow, with only a few scattered delicate hairs. Terminal segments weakly chitinized.

Length of body: 1.1-1.2 mm.

*Male:* Unknown.

Holotype, female (US 67399) and paratype female, Ngarmalk (N. W. Auluptagel), Palau Is., 25 m., light trap, Dec. 13, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

Easily recognized by the short costa and mainly yellow color. Structurally similar to *M. brevineura* Brues (Philippines), but quite differently colored. Other species, similar in color, are distinguishable by structural particulars.

**6. Megaselia (Aphiochaeta) parabasiseta** Bohart (fig. 2).

*Megaselia parabasiseta* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205): 403, fig. 37 (type, Guam, in U. S. National Museum).

*Female:* Front subquadrate, scarcely broader than high, 16:15 (in type 0.256:0.24 mm.) anterior margin but slightly convex, sides parallel. Surface of front uniformly dark brown to black, dull. Ocellar tubercle well defined, piceous black, dull. Median impressed line well developed, somewhat shining. Fine hairs very minute and scattered, inconspicuous. Frontal bristles, on the whole, short and not strong. Two pairs of very unequal post-antennals, upper ones separated by one-fourth width of front, lower ones only half a space apart and delicate. First transverse row of four reclinate bristles somewhat convex, antials strictly convergent, standing near anterolaterals, which are set close to eye margin. Second transverse series not very convex anteriorly, its bristles equidistant, preocellars farther distant from each other than upper supra-antennals. Mediolateral bristle as distant from first as from third lateral. Antennal segment 3 not small, rounded, with a slight apex, dark, blackish. Arista dorsal, short pubescent, much longer than median frontal line (7:4), 0.44 mm. in type. Palpi of usual shape and size, black; distal half of ventral margin set with about five moderately strong bristles which do not become longer toward apex.

Thorax with pleura and scutellum dark brown, mesonotum and pleura reflecting. No bristles between dorsocentrals; two scutellars. Mesopleura wtih a single bristle.

Wing (fig. 2, *a*): Membrane strongly fumose; length 1.55 mm., maximum width 0.70 mm. Costa not thickened, extending far beyond middle of wing (index 0.55). Ratios of costal sections 22:19:6.5. Cilia moderately long (0.083 mm.). In marginal row eight setulae on section 1, eight on 2 plus 3. Fork not large nor long, posterior branch not angulated. Vein $M_1$ arising a little behind fork, its base with a very weak S-curve, fairly well curved at beginning, thence evenly to near margin, not recurved at apex. Vein $M_2$ more strongly curved than usual. Ratios of distances between extreme tips of veins $M_1$, $M_2$, $M_4$, and An 19:33:27. Anal angle a bit less produced than usual. Halteres with stem dark, knob yellow.

Legs yellow; fore legs, including coxae, pale yellow; middle and hind coxae, femora, and (to a lesser degree) tibiae of hind legs brown. Fore tibiae without any isolated cilia. Fore tarsi slender, segment 5 longer than penultimate. Hind femora not especially broad, ventribasally without fringe, without excavation, even without any trace of the curved setae ("halbanliegende Wimpern" of Schmitz). Hind tibiae with straight, complete, dorsal hair seam. About eight weak posterodorsal cilia.

Abdomen widest at segment 2, with six dorsal plates. Tergites 1 and 2 brownish black, dull; tergites 3 to 6 strikingly yellow; 2 not narrower than 1, 3 and following ones distinctly narrower than 1 and 2, but more or less covering segments. All segments are very sparsely covered with extremely minute, delicate hairs, only second tergal plate bears a

lateral tuft of bristlelike hairs. Venter black at base, yellow beyond segment 2. Terminal segments not ovipositor-like, extreme tip brownish and conically projecting.

*Male:* Differs from female in having abdomen uniformly black. Hypopygium (fig. 2, *b*) not large; epandrium blackish brown, dull, symmetrical; when seen from side, scarcely higher than long (contrary to Bohart's figure); upper hind corners a little produced, lower ones rounded. At least on right side near lower margin, one bristlelike hair in addition to five to six thinner and shorter hairs. In lower epandrial half some minute hairs along lower hind margin, between upper and lower hind corners. Anal tube about as long as epandrium in lateral view, not stout, end hairs thicker than remaining ones.

Length of body: Female 1.5 mm.; male 1.2 mm.

DISTRIBUTION: S. Mariana Is., Caroline Is.

PALAU. MALAKAL: Allotype, female (US 67400) by present designation, May 2, 1957, Sabrosky; paratype male, same data.

This species, based upon a single male, is the only Micronesian *Megaselia* which possesses a well isolated mesopleural bristle. The female is easily distinguished from those of other species by the strikingly bicolored abdomen, in which character it resembles *M. conspicua* Brues, *M. fulvicauda* Brues,




FIGURE 2.—*Megaselia parabasiseta:* **a**, wing; **b**, male genitalia.

and *M. pallidicauda* Brues, all from the Philippines [1936, Am. Acad. Arts and Sci., Proc. **70** (9) : 408]. The first two, however, have abdominal tergites blackish, and only *pallidicauda* has, like *parabasiseta,* the abdomen beyond segment 2 yellow ochre. *Pallidicauda* (known only in the male) has, however, the wings hyaline, the heavy veins strongly modified, etc. The male of *parabasiseta* appears to be related to *M. aemula* (Brues), of which I have seen a male from the Philippines; but this has the halteres dark, the hypopygium differently shaped and haired. *M. auriclava* Beyer from upper Burma [1958, Biol. Soc. Sci. Fenn. Comm. **18** (8) : 48], the female of which has the abdomen uniformly black, may be distinguished from *parabasiseta* in the (hitherto unknown) male by the equal supra-antennals.

There is no doubt that the specimens at hand belong to *M. parabasiseta,* although Bohart's description is short and based upon rather trivial characters. Moreover, the epandrium of the male is differently shaped and haired than is shown in Bohart's figure. But the specimens before me are the only

ones with a mesopleural bristle and with the striking character of lacking the usual long curved cilia below on distal half of the hind femora, as shown in Bohart's figure.

### Subgenus **Megaselia** Rondani

*Megaselia* Rondani, 1856, Dipt. Ital., Prodr. **1**: 137 (type species: *M. crassineura* Rondani, synonym of *Phora costalis* v. Roser, Europe).—Schmitz, 1956, *In* Lindner, Flieg. Palaearkt. Reg., Phoridae **33**: 388.

? *Trisometopia* Lioy, 1864, Istit. Veneto Atti. III, **10**: 77.

? *Trichometopia,* see Becker, Bezzi et al., 1907, Kat. Pal. Dipt., 175.

? *Obelosia* Lioy, 1864, Istit. Veneto Atti., III, **10**: page not known to me.

*Lioyella* Enderlein, 1924, Ent. Mitteil. **13**: 275.

? *Heterophora* Borgmeier, 1923, Deutsch. Ver. Wiss. Kunst Sao Paolo Zeistr. 1922, **3**: 158. Nec *Heterophora* Santos, 1921.

The following key will serve to distinguish all species of *Megaselia* s.str. with an unbranched radial sector, described from southeast Asia, the Pacific, and Australia.

1. Costa of female thickened (Mindanao) (females) .......... **directa** Brues
   Costa not thickened .......... 2
2(1). Thorax blackish; first costal section about as long as second .......... 3
   Thorax yellow; first costal section much longer than second .......... 4
3(2). Hind legs and fore coxae blackish brown .......... **incompleta** Brues
   Hind legs, especially fore coxae yellowish (Micronesia) (females) .......... **7. seiuncta**
4(2). Lower pair of supra-antennal bristles much reduced in size, hairlike (Queensland) .......... **flaviscutellata** Beyer
   Lower supra-antennals not much smaller than upper ones, bristlelike (Micronesia) (females) .......... **8. micronesiae**

### 7. Megaselia (Megaselia) seiuncta Beyer, n.sp. (fig. 3, *a*).

*Female:* Front subquadrate, scarcely higher than broad, in the proportion of 14:13 (0.224:0.208 mm. in type), anterior margin but slightly convex; surface of front black, grayish pollinose, with a faint brownish color showing through, dull. Median impressed furrow distinct, shining. Ocellar tubercle deep black, well defined, raised. Fine hairs rather conspicuous although not especially long, considerably more densely arranged than in *incompleta* Brues, standing in black basal dots. Two pairs of unequal supra-antennal bristles, upper ones occupying 11/26 of frontal width, convergent; lower postantennals set more closely together, a little smaller than upper ones (4:5). First transverse reclinate frontal bristles convex anteriorly, antial a bit nearer to eye margin than to supra-antennal and on a slightly higher level than latter one. Four almost equidistant preocellar bristles form an almost straight, transverse row; its innermost bristles stand even a little nearer to each other than upper supra-antennals; frontal bristles arranged in same manner as in *M. incompleta,* however, in that species lower supra-antennals are much more reduced in size. Antennal segment 3 small, rounded, without a distinctly developed apex, densely clothed with extremely minute hairs (microtrichia), uniformly black, dullish. Arista dorsally inserted, not much longer than frontal height, in the proportion of 17:14, in one of the paratypes 0.27 mm. long; pubescence of normal length. Palpi plain yellow, small, normal-shaped, with five bristles arranged in two series, two of which (first and third) belong to inner row; these bristles relatively weak and short, not longer toward apex of palpus,

and arranged and developed in exactly the same way as in *incompleta*. Proboscis slightly elongate but not rostrate, brownish yellow.

Thorax with pleura and scutellum uniformly black; mesonotum somewhat shiny. No bristles between dorsocentrals. Two scutellars. Propleura with two relatively weak and thin bristles along lower edge, in addition, two to three fine, minute hairs before prothoracic spiracle, otherwise propleura are bare like mesopleura and metapleura.

Wing (fig. 3, *a*) almost hyaline. Length 1.17 mm., breath 0.51 mm. Costa not quite reaching middle of wing (index 0.48), proportions of costal sections 16:15. Cilia short, 0.048 mm. (comparatively longer in *incompleta,* 0.066 mm.). Weak veins faintly pigmented, thus anal vein scarcely visible, and vein $M_1$ obliterated basally, latter vein begins without any trace of S-like curve and evenly concave. Ratios of the distances between extreme tips of veins $M_1$, $M_2$, and $M_4$ are 65:94. Anal angle normally protruding. Margin of alula with two hairs. Halteres with stem brown, knob yellow.

Legs, including fore coxae, yellow; hind femora and hind tibiae a little darker, middle and posterior coxae brown, shining. Fore tibiae without any isolated cilia. Fore tarsi slender, tapering apically, apical segment clearly longer than foregoing one. Hind femora without basiventral excavation, no fringe; ventral margin, however, with about three (or more?) relatively long, curved cilia. Middle tibiae 0.42 mm. long; dorsal hair seam of hind tibiate complete, straight; posterodorsal cilia very weak, even in distal half of tibiae; end spur 0.083 mm. long.

Abdomen widest at segment 2, with six dorsal plates, none of which are modified; all these tergites are dull, brownish black, without any lateral tuft of hairs or bristles. Tergite 6 more or less trapezium-like, hind corners rounded. Venter black, bare. Terminal segments not heavily chitinized, tubular, dark; intersegment 7, 8, and oval cerci yellowish.

Total length of body 1.1-1.3 mm.

*Male:* Unknown.

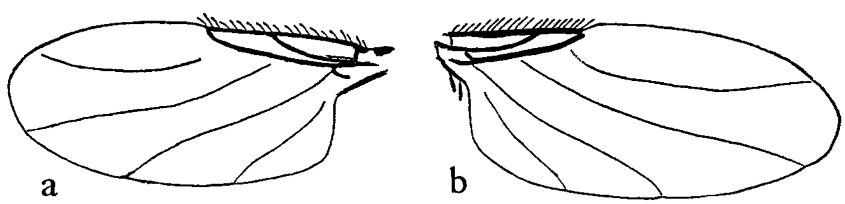



FIGURE 3.—Wings: a, *Megaselia seiuncta*; b, *M. micronesiae*.

Holotype, female (US 67401), Mt. Temwetemwensekir, Ponape, 450 m., Mar. 23, 1948; female, Nanipil, Net Dist., sweeping, Feb. 25, 1948; paratype female, Koror, Palau Is., at light, Nov. 30, 1947; all by Dybas.

DISTRIBUTION: Caroline Is. (Palau, Ponape).

**8. Megaselia (Megaselia) micronesiae** Beyer, n. sp. (fig. 3, *b*).

*Female:* Front almost as high as broad (15:16 or 0.24:0.256 mm.), dark, grayish black, somewhat lighter and more yellowish anteriorly, dullish. Fine hairs rather densely arranged but not long, thus a little more conspicuous than usual. Ocellar tubercle well defined, raised, concolorous. Median impressed line distinct. Four subequal supra-antennal bristles, upper pair occupying five-sixteenths width of front, lower pair closer together, but slightly smaller than upper (in *flaviscutellata* lower pair is considerably reduced in size and scarcely visible). First transverse row of reclinate frontal bristles strongly bent downward medially, antials set midway between inner eye margin and upper postantennals, at a slightly higher level than latter ones. Preocellar and medio-lateral bristles equidistant, forming a feebly convex transverse row; preocellars almost as distant from each other as

upper postantennals. Antennal segment 3 globular with a very slight apex, of normal size, testaceous. Arista dorsal, comparatively short, only a little longer than median line of front (9:8), 0.29 mm. in type; clearly pubescent. Palpi bright yellow, not broad, medium-sized, not unusual in shape; ventral margin clothed with five rather strong bristles arranged in two rows; two of these bristles, which become scarcely longer toward apex of palpi, belong to inner row, remainder to outer row. Apical bristle not differentiated. Proboscis not prominent, epistoma light yellow, remainder (labium and so on) more brownish yellow.

Thorax with pleura and scutellum pale yellow, mesonotum without any reflection; no bristly hairs between two dorsocentrals. Two scutellar bristles. Propleura with two weak bristles at lower edge, two or three hairs before thoracic stigma, otherwise bare; mesopleura entirely bare.

Wings (fig. 3, *b*) with a very faint yellowish tinge. Length 1.26 mm., greatest breadth 0.56 mm. Costal index 0.39-0.40 (0.45 in *flaviscutellata*), ratios of costal segments 17:10. Costal cilia very short and closely placed, 0.05-0.06 mm. long; marginal series with 20 to 21 setulae, 13 standing on first section. Vein $M_1$ evenly curved, obsolete at extreme base, not recurved at apex. Ratios of distances between extreme tips of veins $M_1$, $M_2$, $M_4$, and A, 16:27:19. Anal vein faintly developed, scarcely pigmented. Anal angle not particularly produced. Alular margin with two hairs. Halteres with stem yellow, knob dark brown.

Legs, including all coxae, yellow, hind femora not darkened apically. Front tibiae without any cilia. Segment 5 as long as 4 (in *flaviscutellata,* 5 is clearly longer than 4). Hind femora with no trace of excavation basally, without any fringe, proximal two-thirds beset with a series of distantly placed, curved bristles of moderate length. Hind tibiae with a complete, straight hair seam on dorsal surface and seven rather minute posterodorsal cilia. Anterodorsal cilia absent.

Abdomen widest at segment 2, with six dorsal plates. Tergite 2 slightly longer than others. Tergal plates 5 and 6 narrowed, thus not fully covering dorsal area of these segments; tergite 5 shaped as a trapezium, tapering behind, hind corners not rounded (contrary to *flaviscutellata*); tergite 6 even, narrower than 5, but with parallel sides. Tergites 1 and 2 muddy yellowish, 3 to 6 dusky brown, dull; tergite 3 with a distinct bright-yellow hind margin. Second plate laterally without any bristles. Fine hairs of all tergites scattered and extremely minute, hairs along hind margin of tergite 5 and especially of tergite 6 a little more conspicuous. Venter brownish, bare, but with a set of hairs at the end of segment 6. Terminalia membranous, dark; cerci oval in shape, light brown in color.

Total length of body 1.4 mm. (type specimen).

*Male:* Unknown.

Holotype, female (BISHOP 3601), Ulebsehel (Auluptagel) I., Palau Is., Feb. 7, 1952, Beardsley; paratype female, Mt. Alifan, Guam, S. Mariana Is., Apr. 1946, Krauss.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau).

This species is very close to *M. flaviscutellata* Beyer from Queensland, Australia. *M. micronesiae* differs in that the lower supra-antennals are not as greatly reduced in size; the hind corners of abdominal tergite 5 are not rounded in the female; the costa is much shorter.

**Megaselia (Megaselia)** sp. no. 1.

DISTRIBUTION: Marshall Is.

MARSHALL IS. ARNO: Male, Ine I., on *Allophyllus* and *Asplenium,* July 1950, La Rivers.

There is a single male of an evidently new *Megaselia* belonging to Schmitz's Group VII (see Schmitz, *In* Lindner, Flieg. Palaearkt. Reg., Phori-

dae **33**:405). The species is easily distinguished from other Micronesian *Megaselia* s. str. by the long costal cilia; and from hitherto described *Megaselia* of adjacent regions by the complete absence of the usual apically curved, bristlelike cilia in the proximal half of the ventral margin of the hind femora. Instead of these bristles there are a number of extremely short, densely set microtrichia which I have not observed in any other *Megaselia*. However, this species cannot be adequately described until more material is available.

**9. Megaselia (Megaselia) boninensis** Beyer, n. sp. (fig. 4, *a, b*).

*Male:* Front as high as broad, in type 0.29 mm., its anterior margin normally projected anteriorly, sides parallel. Surface dull, uniformly black; fine hairs as densely arranged as usual, rather minute. Median impressed furrow present; ocellar tubercle well defined, raised concolorous. Upper supra-antennal bristles not weaker than remaining frontal bristles, occupying five-eighteenths the width of front, 0.078 mm. Lower postantennals strongly reduced, hairlike and short. First transverse row of four frontals convex anteriorly, antials convergent to each other, but not strictly, set exactly midway between upper supra-antennal bristle and anterolateral one, and slightly higher than the former. Antennal segment 3 black, dullish, rounded in shape, without distinctly developed apex, not enlarged. Arista dorsally inserted, a little longer than front height, 0.352 mm. in type specimen, not densely pubescent. Palpi relatively a bit short and broad, uniformly yellowish, but not bright yellow, bristles along lower edge weak, not becoming longer toward apex. End bristle not differentiated.

Thorax with pleura and scutellum black, mesonotum dull, pleura partly reflecting. Two scutellars. Mesopleura entirely bare.

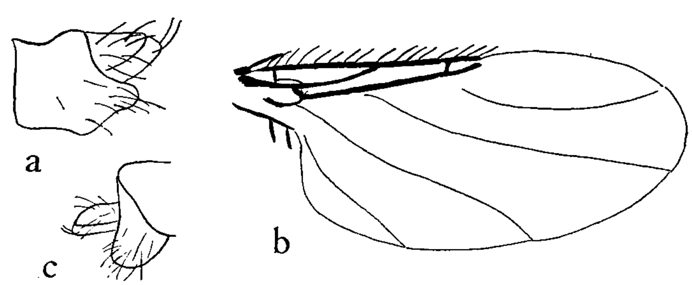



FIGURE 4.—a, b, *Megaselia boninensis: a,* male genitalia; *b,* wing. c, *M. basiseta,* paratype, male genitalia.

Wing (fig. 4, *b*) almost without tinge; 1.46 mm. long, 0.61 mm. wide. Costa nowhere thickened, extending beyond middle of wing (index 0.52). Costal cilia moderately long (0.083 mm.); altogether about 15 cilia, 8 of which stand on section 1. Costal sections 20:14:7. Fork of radial vein wide-angled, anterior branch ($=R_2$) rather vertical, short. Vein $M_1$ arising without any S-curve beyond furcation, everywhere concave anteriorly, not recurved distally. Ratios of distances betwen extreme tips of veins $M_1$, $M_2$, $M_4$, and A, 17:29:25. Anal angle normally projected. Halteres yellow, stem black.

Legs, including fore coxae, yellow, but not especially light, hind femora not maculated at tip. Middle coxae brownish to yellowish brown, hind coxae blackish. Fore tarsi slender. Dorsal seam of mid tibiae not quite complete, posterodorsally accompanied by eight delicate setulae. Dorsal hair seam of hind tibiae evenly bent, complete, two weak posterodorsal cilia basally and eight stronger and clearly visible ones distally. Hind femora 0.59 mm. long, 0.22 mm. broad; ventribasally without excavation or fringe, apically curved hairs moderately thick and not very long.

Abdomen widest at segment 2, dorsal plates dull, black, tergites 2 to 4 very faintly, 5 distinctly, margined behind. Plate 2 not much longer than 3. All tergites are clothed with minute hairs along hind margins and at sides, these a little longer on tergite 6, tergite 2 without lateral tuft of bristles. Venter blackish, sparsely hairy. Hypopygium (fig. 4, *a*) not very prominent, dull black brown; epandrium almost symmetrical; when seen from left, slightly longer than high, as upper hind corners all produced in a rather broad, distally rounded, almost lobelike projection; this structure and lower hind corners covered with some very thin hairs, one of which is longer but not thicker than remainder. Anal tube short, stout, dusky yellow. End hairs not differentiated.

Length of body: 1.44 mm.

*Female:* Unknown.

Holotype, male (US 67402), Minato-ko ("Gen.'s Beach"), Yatsuse R., Chichi Jima, Bonin Is., Apr. 10-22, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima).

This species is, as far as I can see, not particularly near to any species hitherto described from the Pacific and Oriental Regions. In Malloch's key to the *Megaselia* of Samoa [Insects of Samoa **6** (9) : 332] it runs to *M. basiseta* Malloch, of which I obtained the male paratype from the British Museum (Nat. Hist.), London through the kindness of Mr. R. L. Coe. *M. basiseta* has the costal cilia shorter, the vein $M_1$ differently bent, the hypopygium not produced posteriorly, and the halteres entirely black. Figure 4, *c* is a sketch of the (greatly hidden) epandrium and anal tube of the male paratype. *M. setifemur* Bohart differs from *boninensis* in having the venter yellow and the halteres black. *M. debilis* Brues from Sydney, of which the subgeneric position is unknown, has, unlike the new species, "the angle at furcation of third (vein) very acute."

### 10. **Megaselia (Megaselia) setifemur** Bohart.

*Megaselia setifemur* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205) : 398, fig. 38 (type, Guam, in U. S. National Museum).

DISTRIBUTION: S. Mariana Is.

S. MARIANA IS. GUAM: Pago River Valley, June 1945, swept from dense jungle vegetation on a steep slope, G. E. Bohart. (Data of holotype male, after Bohart.)

The species, based upon a single male, does not appear to be present in the collection before me. In spite of its short description, I have tentatively included it in the key to Micronesian species of *Megaselia,* but the species needs a critical redescription. Bohart states that "the apical lamella [of the hypopygium is] divided into two parts, . . ."; this is, however, undoubtedly due to maceration in KOH or mounting in Euparol.

### 11. **Megaselia (Megaselia) tenebricior** Beyer, n. sp. (fig. 5).

*Female:* Frons subquadrate, scarcely higher than broad (17 : 16), in type specimen, 0.27 : 0.256 mm. Anterior margin weakly convex medially, sides subparallel. Frontal surface dull, uniformly black. Ocellar tubercle (stemmaticum) well defined, raised, concolorous. Median impressed line distinct. Fine hairs rather minute, but nevertheless more

evident than normal, due to their comparatively dense arrangement. Two pairs of subequal supra-antennals, lower pair about one-sixth or one-fifth shorter and noticeably closer together than upper which are separated by almost one-third of width of front. Antial much below anterolateral, but not quite as near to eye margin as this, on a slightly lower level than upper postantennal. Second transverse row straight, its bristles not equidistant, but preocellars set relatively less distantly, even a bit nearer together than upper postantennals. Second lateral midway between first and third. Antennal segment 3 (to me) of scarcely normal size, spherical with a faint apex in lateral view, black. Arista nearly 1.5 times longer than frontal height, 0.40 mm. long in type specimen, densely and shortly pubescent. Palpi bright yellow, quite usual in shape and size, with six moderately strong bristles of about equal length, terminal bristle not longer than preceding ones.

Thorax, including scutellum, black; mesonotum reflecting, with a faint brownish base color showing through; pleura in lower halves more brown than black, reflecting except on upper posterior portion of the mesopleura. No bristles between dorsocentrals. Two scutellars.

Wing (fig. 5): Membrane with a grayish cast; length 1.38 mm., maximum width 0.61 mm. Costa nowhere thickened, long, although clearly short of middle, index 0.46-0.47. Proportions of costal sections 18:11:6, thus section 1 a bit longer than 2 and 3 combined. Costal cilia short, 0.08 mm.; altogether 17 setulae in marginal row, 10 of which belong to section 1. Fork of third vein acute-angled, but not elongated, lumen not narrow. Vein $M_1$ arising distinctly behind furcation, with no trace of a hook- or S-curve at base, proximally well bent toward costa, thence showing a rather flat course,

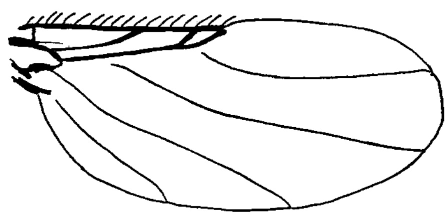


FIGURE 5.—*Megaselia tenebricior*, wing.

extreme tip very faint and very slightly recurved. Distances between apices of veins $M_1$, $M_2$, $M_4$, and A, 16:29:23. Anal vein well pigmented; anal angle flat. Halteres yellow.

Legs yellowish, fore legs brightest of all; mid coxae and hind femora darkened. Fore tarsi slim. Hind femora less than three times longer than broad (41:15), 0.66:0.24 mm. in type specimen; ventribasis beset with a series of two very fine and six medium-sized, apically curved bristles of equal length. Hind tibia somewhat shorter than femur, 0.62 mm., its dorsal hair seam straight, posterodorsally accompanied by about 11 clearly visible, not very strong setulae.

Abdomen widest at segments 2 and 3, with six dorsal plates; these are more or less shining, brownish, each having a very narrow, transverse white band along hind margins. Median length of tergites 1 to 6 are 6:9.5:8:10:10:8, or 0.096:0.15:0.13:0.16:0.16:0.13 mm. Tergite 6 narrower than anterior one, not quite covering dorsum of segment, trapezium-shaped, tapering behind, its hind corners not rounded; at base of this tergite medially a very small, membranous lunular excavation, giving impression of a glandular opening. Hairs almost wanting centrally on tergites, only visible at sides and along hind margins, nowhere bristlelike. Tergite 2 without any lateral tuft of bristles. Venter black, clothed with some hairs. Segment 1 of the fleshy postabdomen dark, tip bright yellow.

Length of body about 1.5 mm.

*Male:* Unknown.

Holotype, female (US 67403), Ngaiangl, Palau Is., May 9, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

*M. tenebricior* is a blackish species (thus distinguished from all members of the *sauteri* group except *perumbrata* Brues) with long, short-ciliated costa and two scutellar bristles. The mesopleura are bare, according to the subgenus. In the Oriental and Pacific Regions there are, as far as I can decide from the various descriptions and the species in my collection, only three *Megaselia* showing the above combination of characters: *M. politifrons* Brues, *M. pedella* Beyer, and *M. perumbrata* Brues. *M. politifrons* has, however, the front conspicuously shining; *pedella* has the halteres black, not yellow; *perumbrata* shows quite different costal sections. In Brues' key to the *Megaselia* of the Philippines, *M. tenebricior* runs to *M. unisetosa* Brues, which, however, has the first section of the costa shorter than the second and is otherwise very different.

12. **Megaselia (Megaselia) scalaris** (Loew).

*Phora scalaris* Loew, 1866, Berliner Ent. Zeitschrift **10**: 53 (type, North America, in Museum of Comparative Zoology).

*Phora xanthina* Speiser, 1908, Berliner Ent. Zeitschrift **52**: 148.

*Phora coniuncta* Becker, 1908, Zool. Mus. Berlin, Mitt. **4** (1): 210.

*Phora fissa* Becker, ibid., 193.

*Aphiochaeta circumsetosa* de Meijere, 1911, Tijdschr. Ent. **54**: 348.

*Aphiochaeta ferruginea* Brunetti, 1912, Indian Mus., Rec. **7**: 83.

*Aphiochaeta repicta* Schmitz, 1914, Nat. Hist. Gen. Limburg, Jaarb., 108.

*Obelosia plusiivorax* Enderlein, 1929, Wiener Ent. Zeitung **46**: 104.

DISTRIBUTION: Almost cosmopolitan, preferring tropical and subtropical regions.

BONIN IS. CHICHI JIMA: Two males, two females, Omura, "Camp Beach," Apr. 1958; male, Okumura, "Yankee Town," Apr. 1958. HAHA JIMA: Two females, male, Okimura, Apr.-June 1958. All by Snyder.

S. MARIANA IS. SAIPAN: As Mahetog area, female, Jan. 1945, male, Apr. 1945, Dybas. GUAM: Two females, Piti, Feb. 1936, ex dead caterpillar, Swezey; female, Pt. Ritidian, June 1945, Bohart and Gressitt.

PALAU. BABELTHUAP: 16 females, Ngiwal, Nov. 1951, Gressitt. KOROR: Eight females, Jan., July 1953, at light and ex rotten tomato, Beardsley.

MARSHALL IS. ENIWETOK: 11, Jobtan I. (Japtan), Aug. 1956, Tuthill.

This species, although variable in color and in number of scutellar bristles, is easily distinguished from the other Micronesian *Megaselia* by the characters given in the analytic key on a previous page. One of the best known *Megaselia*, it has been thoroughly described by various authors. Bohart [1947, U. S. Nat. Mus., Proc. **96** (3205): 406] recorded it from Guam.

*Megaselia scalaris* has been recorded as breeding in all sorts of organic matter.

### 13. **Megaselia (Megaselia) curtissima** Beyer, n. sp. (fig. 6).

*Female:* Front distinctly broader than high, but varying a little in this respect (17:13 or 8:7); its anterior margin not projecting much medially, sides parallel. Front uniformly colored, black or with a brownish base color, generally rather dull, but slightly shiny in front of concolorous, well-defined, raised ocellar tubercle. Median furrow present. Fine hairs rather conspicuously developed, a little thicker than usual, standing in scarcely visible basal dots. All frontal bristles rather stout; four postantennals, upper ones sepaated by three-eighths width of front; lower ones closer together, not much shorter than upper. Antial bristle much nearer to inner eye margin than to upper supra-antennal, a little below anterolateral bristle which stands close to eye. Second row convex anteriorly to a normal degree, preocellars standing unusually far apart, noticeably farther apart than upper supra-antennals; each preocellar bristle stands even nearer to eye margin than to median frontal line. Antennal segment 3 not large, of usual shape, rounded, with a very slight apex, black to brown, dull. Arista dorsally inserted, twice as long as head height, 0.42 mm., long pubescent. Palpi rich yellow, not short, slender, of usual size; distal three-fourths of ventral edge beset with about seven bristles, three of which are hairlike and minute; remaining four, though rather weak and relatively short, becoming gradually longer toward apex; end bristle a little differentiated, not quite twice as long as breadth of palpus (proportions 5:9).

Thorax with scutellum and pleura dark brown to brownish yellow; mesonotum but slightly reflecting. No bristles between dorsocentrals. One pair of normal scutellar bristles in addition to a much smaller anterior pair (half size of posterior pair). Propleura with two to three weak bristles at lower edge and a vertical row of minute hairs along hind margin, otherwise bare; mesopleura entirely bare.

Wing (fig. 6, *a*) with a somewhat grayish tinge. Length 1.28 mm., maximum width 0.54 mm. Costa not thickened, much extending beyond middle of wing, index 0.56-0.57. Ratios of costal segments 9:7:4, thus section 1 distinctly longer than 2 but shorter than 2 plus 3. Costal cilia closely placed and extremely short (0.032 mm.), not longer than diameter of costa. Fork of radial sector large, but not long. Vein $M_1$ arising a little beyond fork, with an extremely short and faintly developed S-shaped curve immediately at base, thence fairly well curved, on whole evenly bent, not recurved at tip. Vein $M_2$ slightly more sinuous than usual. Ratios of distances between extreme tips of veins $M_1$, $M_2$, $M_4$, and A, 12:28:21. Anal vein well pigmented. Anal angle, as in all members of *sauteri* group, not developed, retracted. Halteres black, stem often yellowish.

Legs, including all coxae, yellow, hind femora not darkened apically, but sometimes mid coxae and entire hind legs reddish brown. Fore tarsi slender, not much tapering distally. Fore tibiae without any isolated cilia. Hind femora not conspicuously broadened, three times longer than broad, 0.624:0.21 mm.; on proximal half of ventral margin a series of six backwardly curved bristles, only four of these being moderately strong. Hind tibiae with a straight, rather faint, dorsal hair seam, posterodorsal cilia extraordinarily weak, scarcely developed; in this respect *M. curtissima* resembles *perturbans* Malloch. *M. chipensis* Brues seems to have these cilia of usual length. Brues, in his original description of *chipensis* (1911, Mus. Nat. Hungarici, Ann. 9: 554), says: "Middle and posterior tibiae with moderately strong setulae forming a single series just inside the hind edge."

Abdomen broadest at segment 2, narrowing behind, with six dorsal plates. Tergite 2 of moderate length, 3, 4, and 5 a little longer than 2; plate 5 has hind corners more or less rounded, 6 seems to be divided by a median suture which I am inclined to believe is an impressed furrowlike suture, not just a faint longitudinal line. At base of this segment there is possibly a glandular opening (at least I can see in two or three females a median, indefinitely shining, semicircular structure of membranous nature, known in many other *Megaselia* females, such as *heterodactyla* Beyer from Hawaii). All terga

dull, uniformly black, without transverse bands along hind margins; these tergites are clothed with delicate, minute bristles not long and bristlelike; plate 2 without a lateral tuft of bristles. Venter dark brown, with fine hairs at least caudad from segment 3. Terminal segments not heavily chitinized, cerci yellowish.

*Male:* Differs from female in having anterior scutellar bristles reduced to minute hairs. Hypopygium (fig. 6, *b*) small; epandrium brownish black, dull, when seen from left side (right one not visible in only male at hand) much higher than long, lower hind corner noticeably projecting, a long, downwardly directed bristle at lower anterior corner, a second, much weaker bristle near lower hind corners where there are two or three delicate hairs. Anal tube yellowish brown, short and stout, not longer than epandrium; end hairs seemingly short.

Length of body: 1.1-1.4 mm.

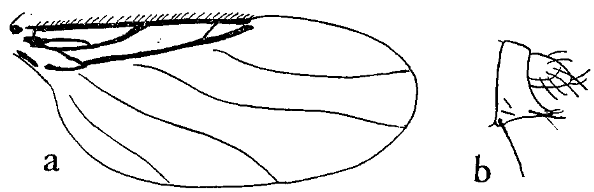



FIGURE 6.—*Megaselia curtissima:* **a,** wing; **b,** male genitalia.

Holotype, female (US 67404), Dugor, Weloy, Yap I., June 15, 1957, Sabrosky. Allotype (US), hill behind Yaptown, Yap I., 60 m., Nov. 28, 1952, Gressitt. Paratypes: Five females, Dugor, Weloy, Yap I., June 14, 15, 1957, Sabrosky; Koror, Palau Is., female, Apr. 24, 1957, mangrove, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Yap).

Belonging to the *sauteri* group. There are only two species of this group which have the costal cilia as extremely short as it is found in *curtissima: chipensis* Brues (Taiwan) and *perturbans* Malloch (Samoa). The latter species has, however, the halteres yellow (Malloch's description is too brief to recognize other structural differences which are certainly present); *M. chipensis* has the lower supra-antennals strongly reduced in size; the costal sections of the wing venation are different; the posterodorsal cilia of the hind tibiae seem to be longer. In Brues' key to the *Megaselia* species of the Philippines [1936, Am. Acad. Arts and Sci., Proc. **70** (9): 372] it runs to *apposita* Brues of which I have seen a female; *apposita* has, however, much longer costal cilia; the antennae are yellow, not blackish (color of antennae is a rather constant character in the members of the *sauteri* group); abdominal tergite 6 of the female is triangular in form. The male of *curtissima* may be readily recognized by the characteristic form of the hypopygium (fig. 6, *b*).

**14. Megaselia (Megaselia) tetricifrons** Beyer, n. sp. (fig. 7).

Belonging to the *sauteri* group; front (including antennae) and abdomen dark, thorax and legs yellowish. Palpi, antennae, and fore tarsi without any peculiarities. Costa long,

cilia moderately short, section 1 of costa longer than 2 but shorter than 2 and 3 combined. Abdominal tergite 6 quite normal.

*Female:* Front subquadrate, as high as broad, 0.27 mm.; its anterior margin slightly convex medially, sides parallel; frontal surface black, nowhere lighter, scarcely or a little shining. Ocellar tubercle well defined, concolorous; median impressed furrow distinctly developed. Fine hairs not very dense, inconspicuous. Two pairs of unequal supra-antennals, lower ones two-thirds or three-fourths as long as and as thick as upper, which are separated by about one-fourth width of front. First transverse row of reclinate bristles strongly bent downward medially, antial rather near upper edge of antennal groove, on a noticeably lower level than upper postantennals, distance from these twice as great as that from eye margin. Second transverse row straight, bristles practically equidistant, preocellars only very little farther apart from each other than upper supra-antennals. Second lateral bristle midway between first and third. Antennal segment 3 medium-sized, spherical, with a very faint apex even in lateral view, black. Arista 1.5 times longer than front height, 0.42 mm.; its pubescence normally dense and not short; palpi (fig. 7, *b*) not large, length 0.12 mm., maximum breadth 0.05 mm.; ventral edge beset with a few hairs at base, followed by two comparatively weak bristles and then six longer bristles of about equal length; terminal bristle not differentiated, 0.07 mm. long.

Thorax, including pleura and scutellum, yellowish; mesonotum (and pleura in part) somewhat shining. Between the two dorsocentrals there are no true bristles, only two scutellars. Mesopleura bare.

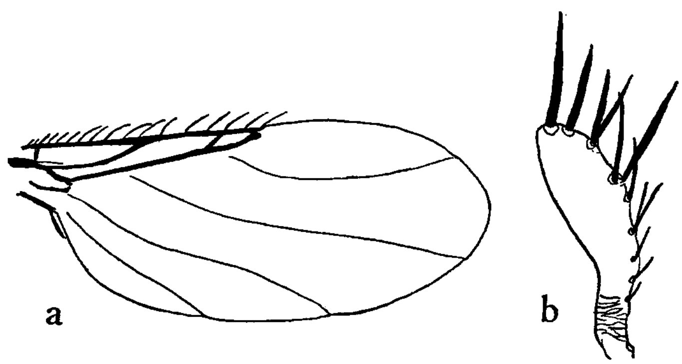



FIGURE 7.—*Megaselia tetricifrons:* **a**, wing; **b**, palpus.

Wing (fig. 7, *a*) membrane with a distinct grayish tinge. Length 1.58 mm., maximum breadth 0.62 mm.; costa not thickened, long, extending well past middle of wing, index 0.54-0.55. Proportions of costal sections 21 : 17 : 8.5. Costal cilia moderately short, 0.09 mm.; in marginal series are 15 cilia, 8 or 9 of these belonging to section 1. Fork of radial vein not acute-angled, not particularly long, lumen slightly larger than normal. Vein $M_1$ arising distinctly beyond furcation, at base with a faint, short S-shaped curve, then well bent toward anterior margin of wing, thence becoming more evenly convex, no apical recurve; relative distances between extreme tips of veins $M_1$, $M_2$, $M_4$, and A, 19 : 30 : 26. Anal vein strongly pigmented; anal angle flat. Halteres light or dark brown.

Legs, including all coxae, yellow; hind femora brownish at tip. Fore tarsi slender. Hind femora nearly three times as long as broad, 0.70 : 0.29 mm.; ventribasis with a series of about two very weak setulae and more distally five or six moderately strong, apically curved setulae almost of equal length. Hind tibiae a little shorter than femora, 0.65 mm., dorsal hair seam straight, posterodorsally accompanied by four very minute cilia at base and seven more evident distal ones.

Abdomen widest at segment 2, with six dorsal plates, none reduced or otherwise modified. Tergites all dullish black with a brownish base color; rarely banded behind. Relative lengths of dorsal plates 1 to 6 are 3:13:14:14:13.5:13, thus 2 and 6 not at all elongated; tergite 6 of normal shape. Hairs almost lacking on disc of tergites, very delicate along sides and hind margins, nowhere bristly. Tergite 2 without any tuft of lateral bristles. Venter dark, beset with some very weak hairs. Terminal segments fleshy, dark, extreme tip brownish yellow.

Length of body: 1.3-1.7 mm.

*Male:* Unknown.

Holotype, female (US 67405), Southwest Bay, Ani Jima, Chichi Jima, Bonin Is., on beach, May 17, 1958, Snyder. Paratypes: Two females, Futamiko, Chichi Jima, at light, May 10, 1958, Clagg; female, Okimura, Haha Jima, Apr. 26-May 9, 1958, Snyder; female, Sakai-ura, Bull Beach, Ani Jima, Chichi Jima, May 21-31, 1958, Snyder and Mitchell; female, same data, not designated as paratype.

DISTRIBUTION: Bonin Is. (Chichi Jima, Haha Jima).

There are, as far as I can decide, only the following five species of the *sauteri* group which, like *tetricifrons,* have the antennae black or dark: *M. chipensis* Brues (Taiwan) and *curtissima* n. sp., both easily known by their extremely short costal cilia; *perumbrata* Brues and *equidistans* Brues (both from Philippine Islands), which have quite different proportions of the costal sections; *tenebricior* n. sp., with a wholly black thorax.

**15. Megaselia (Megaselia) suis** Bohart (fig. 8).

*Megaselia suis* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205): 399, fig. 36 (type, Guam, in U. S. National Museum).

Belonging to the *sauteri* group; antennae, front, thorax, and halteres yellow; antennae, palpi, and fore tarsi normal in shape and size. Costa very long (0.56-0.57), first section a little longer than second. Costal cilia moderately short. Fork of third vein noticeably acute-angled (fig. 8, *a*). Dorsal hair seam of hind tibiae straight. Venter rather bristly. For hypopygium see figure 8, *c* (Bohart's figure is incorrect). Abdominal tergites 3 to 6 of female reduced in breadth.

*Male:* Front subquadrate, slightly longer than broad (17:16), 0.27:0.25 mm.; anterior margin slightly produced medially, sides parallel. Frontal surface somewhat shining, unicolorously bright yellow, rarely yellowish brown. Ocellar tubercle well raised, near ocelli partly black. Median impressed line distinct. Fine hairs rather inconspicuous. Two very unequal pairs of postantennals, lower ones nearly hairlike and closer together than upper, which are separated by five-sixteenths width of front. First row noticeably bent downward medially. Antials well but not strictly inclined toward each other, exactly midway between eye margin and postantennals, set on a slightly lower level than latter. Second transverse row weakly convex anteriorly, its bristles practically equidistant, preocellars occupying three-eighths width of front, thus somewhat farther apart from each other than supra-antennals (6:5). Second lateral bristle a little nearer to third than to first. Antennal segment 3 of normal size, scarcely higher than broad, yellow; arista 0.43 mm. long, proportion to height of front (27:17), a bit more densely pubescent than usual. Palpi yellow, medium-sized, of quite normal shape and bristling.

Thorax, including pleura and scutellum, yellow; mesonotum somewhat shining. No bristles between two dorsocentrals; only two scutellars; mesopleura bare.

Wing (fig. 8, *a*) with a distinct grayish cast. Length 1.58 mm., maximum breadth 0.62 mm. Costa not thickened, very long, extending well past middle of wing (index

0.56-0.57). Proportions of costal sections 20:23:7 or 19:22:6, thus first section distinctly but not much shorter than second. Costal cilia moderately short, 0.07 mm.; altogether 21 setulae, 9 on section 1. Fork of radial vein acute-angled and rather long, lumen narrow. Vein $M_1$ arising distinctly behind furcation, a hooklike curve practically wanting at beginning; vein on the whole well concave, recurved at extreme apex. Relative distances between extreme tips of veins $M_1$, $M_2$, $M_4$, and A, 18:32:25. Anal vein relatively well pigmented; anal angle flat. Halteres yellowish.

Legs bright yellow, including all coxae; hind femora with a dark macula near apex. Fore tarsi slim. Hind femora three times as long as broad, 0.72:0.24 mm.; a series of about four moderately long, apically curved cilia near ventribasis. Hind tibiae 0.64 mm. long, dorsal hair seam rather straight, posterodorsally accompanied by about 10 visible, but not very strong setulae.

Abdomen widest at segment 2; greatly varying in color; all tergites may be (dullish) yellow, except distal halves of 2 and 4; but sometimes distal half of 2 and whole of 3 and 4 blackish and sharply contrasting with remainder of abdomen. All tergites are sparsely hairy, especially centrally, hairs becoming longer but not bristlelike along hind margin of dorsal plate 6. Segment 2 with a lateral tuft of almost hairlike bristles. Venter bright or orange yellow, conspicuously hairy. Hypopygium (fig. 8, *c*) not prominent. Epandrium dark brown, dull; when seen from left side, longer than high, without any bristles, but covered with some delicate hairs, one longer than the others, but not thicker. Anal tube slender, at least as long as epandrium (when seen from side), yellow. End hairs a little differentiated.

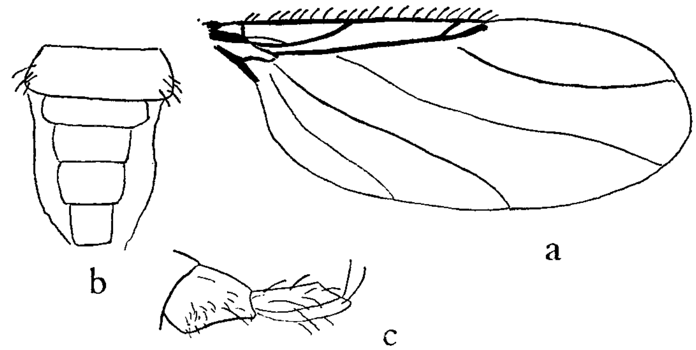



FIGURE 8.—*Megaselia suis:* **a**, wing; **b**, dorsal view of abdomen (tergites 2 to 6); **c**, male genitalia.

*Female:* Hitherto unknown. Essentially like male, aside from abdominal characters; tergite 2 with a slight tuft of lateral bristles. Following segments become gradually narrower toward apex (fig. 8, *b*). Tergites 2 and 6 noticeably elongated, 3 seemingly shorter than 4. Terminal segments not chitinous, fleshy.

Length 1.5-1.6 mm.

DISTRIBUTION: S. Mariana Is., Caroline Is.

S. MARIANA IS. GUAM: Male, Nimitz Hill, light trap, May 1956, Clagg; male, Piti, swept from lawn grass, Nov. 1936, Swezey.

PONAPE: Female, Mt. Temwetemwensekir, 180 m., light trap, Jan. 1958, Gressitt.

TRUK. Ton (Tol): Female, Mt. Unibot, 300 m., Feb. 1953, Gressitt.

I prefer not to select an allotype from these two females. Bohart's description of the species is quite inadequate and fits many species of the *sauteri* group. Through the kindness of Dr. D. Elmo Hardy, Honolulu, I obtained from Bernice P. Bishop Museum two male paratypes in alcohol, bred from pig dung; the diagnosis is based on these and four other specimens.

### 16. Megaselia (Megaselia) heterochaeta Beyer, n. sp. (fig. 9).

Member of *sauteri* group; front, thorax, and legs yellow, antennae and sometimes also halteres a little darker. Postantennals very unequal. Antennae, palpi, and fore tarsi normally developed. Costal index 0.57, proportions of costal sections 19:23:7. Costal cilia short. Fork of radial vein rather short, lumen small (see figure 9, *b*). Hypopygium with a very strong bristle on right and a much weaker one on left (fig. 9, *a*).

*Male:* Front subquadrate, as long as high, 0.26 mm. in type. Anterior margin weakly convex medially, sides parallel. Frontal surface yellow, not much shining. Ocellar tubercle blackish, thus contrasting with remaining front, well defined. Middle furrow distinct. Fine hairs not very evident. Four very unequal postantennals, lower pair hairlike, upper pair separated by scarcely more than one-fourth width of front. First transverse row of reclinate bristles curved downward medially, antials midway between eye margin and supra-antennals, on a noticeably lower level than the latter. Second transverse row straight, its bristles equidistant, preocellars only a little farther apart from each other than upper postantennals, occupying five-sixteenths of frontal breadth. Second lateral midway between first and third. Antennal segment 3 darker than front, but not blackish, spherical with a faint apex, medium-sized. Arista 0.40 mm. long, of normal length. Palpi bright yellow, of usual shape and size; ventral edge beset with six comparatively short bristles of about equal length, arranged in two series of three each; the first, third and fifth bristles standing in inner row. End bristle not differentiated, 1.3 times longer than maximum breadth of palpus.

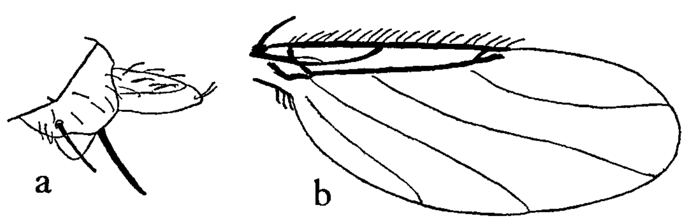



FIGURE 9.—*Megaselia heterochaeta:* **a,** male genitalia; **b,** wing.

Thorax, including pleura and scutellum, yellowish; mesonotum somewhat reflecting; no real bristle between dorsocentrals; only two scutellars; mesopleura bare.

Wing (fig. 9, *b*) with a distinct grayish cast. Length 1.52 mm., maximum width 0.58 mm. Costa not thickened, very long, index 0.57-0.58. Proportions of costal sections 19:23:7. Costal cilia short, comparatively shorter than in *tetricifrons,* 0.08 mm. long; altogether 23 cilia in marginal series, 11 in first section. Fork of third vein a little short, lumen narrow. Vein $M_1$ arising at furcation, with an extremely faint and short S-shaped curve at base, then well bent toward anterior margin of wing, thence more evenly curved, not recurved at apex. Relative distances between tips of veins $M_1$, $M_2$, $M_4$, and A, 16:28:25. Anal vein well pigmented; anal angle flat. Halteres yellow or (in one specimen) brownish.

Legs, including all coxae, bright yellow, tips of hind femora darkened. Fore tarsi slim. Hind femora about three times as long as broad, 0.70 : 0.24 mm. Ventribasis with five cilia, first two (and sometimes the last one) weak. Hind tibiae shorter than femora, 0.59 mm.; dorsal hair seam straight, posterodorsally, with eight or nine conspicuous cilia, only first one or two sometimes absent.

Abdomen widest at segment 2, dorsal plates dullish, yellow, but first half of tergite 2 and whole of tergites 3, 4, and 6 dark. Hairs fine, longer along margin of tergite 6. Dorsal plate 2 bears a lateral tuft of bristles. Hypopygium (fig. 9, *a*) not prominent; epandrium dull, brown, shape as figured, no projections; covered with minute hairs; with one bristle on each side, one on right much longer and stouter than the one on left. Anal tube rather slender, yellow; terminal hairs weak.

Length of body: 1.5-1.7 mm.

*Female:* Unknown.

Holotype, male (BISHOP 3602) and two male paratypes, Mt. Temwetemwensekir, Ponape, Caroline Is., 180 m., Jan. 16, 1953, Gressitt; male, Mt. Matante, Kusaie, 380 m., Mar. 4, 1953, Clarke.

DISTRIBUTION: Caroline Is. (Ponape, Kusaie).

### 17. **Megaselia (Megaselia) palpella** Beyer, n. sp. (fig. 10).

*Male:* Front distinctly but not strongly broader than long (17 : 15), 0.27 : 0.24 mm.; anterior margin slightly convex medially, sides subparallel. Surface of front grayish or blackish, sometimes yellow in anterior half, shining. Ocellar tubercle well defined, black; median impressed line distinct. Fine hairs delicate, inconspicuous, not more densely arranged than usual. Lower supra-antennals entirely wanting or very minute, upper pair well developed, thick, occupying about one-fourth or less of width of front. First transverse row of reclinate bristles moderately convex below, antials strictly inclined to each other, not quite close to anterior frontal margin, but set at a slightly higher level than upper supra-antennals; antials are twice as far apart from upper postantennals than from eye margin. Bristles of middle transverse row form a line that curves downward medially, preocellars mostly being a little nearer to each other than their distance from respective mediolateral, although a bit farther apart from each other than postantennals (5 : 4). Middle lateral bristle not quite as far from upper one as from lower. Antennal segment 3 rounded, with a rather distinct apex (when seen from side), somewhat higher than broad, not small, deep yellow in color, dull. Arista not particularly long, 0.32 mm. in type, 1.33 times length of front, densely pubescent, thus appearing thick. Palpi of same color as antennae, not darkened, in shape and bristling resembling that of male of the Holarctic species *Megaselia* (*Aphiochaeta*) *projecta* (Becker), but not so greatly swollen; nevertheless palpi clearly enlarged and more than usually projected. Only end bristle may be called a real (but weak and short) bristle, others standing proximal to it along the ventral edge of palpus are hairlike and minute, as in *projecta* male.

Wing (fig. 10, *a*) with a distinct grayish cast. Length 1.31 mm., maximum width 0.61 mm. Costa not thickened, fully or nearly reaching middle of wing, index 0.48-0.50; proportions of costal segments 18 : 11 : 6. Costal cilia short, 0.061 mm.; altogether 16 pairs of cilia, 10 standing on section 1. Fork of third vein not acute-angled, lumen slightly larger than usual. Vein $M_1$ arising well beyond radial fork, beginning without or with an extremely short and slight hooklike curve, then more or less evenly convex over whole length, recurved at extreme tip; relative distances between apices of veins $M_1$, $M_2$, $M_4$ and A, 18 : 25 : 21. Anal vein clearly visible. Anal angle normally produced. Knob of haltere coffee brown.

Legs, including all coxae, bright yellow; hind femora darkened at extreme tip. Fore tarsi slender. Middle femora not much broadened, 0.56 mm. long, 0.14 mm. broad; ventral margin with some very minute, closely set hairs at base, representing usually much longer, apically curved hairs. Posterodorsal cilia weak. Hind femora a little slimmer than normal, 0.66 : 0.21 mm.; ventribasis with a row of about eight curved hairs of moderate

length, decreasing slightly distally. Posterodorsal cilia, accompanying straight dorsal hair seam, rather delicate, about eight in number aside from some at extreme base which are scarcely visible.

Abdomen: Segment 1 yellow, segments 2 to 6 dull black with a faint brownish tinge showing through. Venter yellow. Hairs everywhere short and delicate, inconspicuous, a a little longer at sides and especially along hind margin of segment 6. Segment 2 with a lateral tuft of weak, short bristles. Hypopygium (fig. 10, *b*) not very prominent. Epandrium dark brown, dull, upper and lower hind edges projected, but their shape not clearly visible in only male specimen before me (figure 10, *b* is not to scale, as the hypopygium from the specimen used is in bad condition; the chaetotaxy, however, is quite intact). Three or four comparatively strong hairs at each side and five weaker ones apically curved near lower hind corner; upper hind corner in all probability not hairy. Anal tube a little stout, yellow, and hairs distinct but not longer than remainder of hairs.

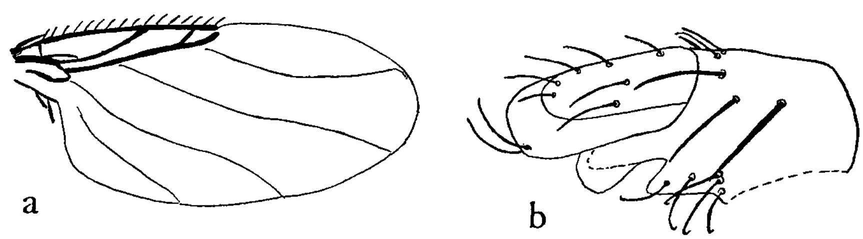


FIGURE 10.—*Megaselia palpella:* **a**, wing; **b**, male genitalia.

*Female:* Superficially like male, but with following differences: palpi of normal size, shape, and chaetotaxy. Second half of abdominal segment 1 dark; segment 2 scarcely and 6 well elongated; first postabdominal segment black, tip of fleshy terminalia yellow.

Length of body: About 1.5 mm.

Holotype, male (US 67406), Ngarmalk (N.W. Auluptagel), Palau Is., 26 m., light trap, Dec. 12, 1952, Gressitt. Allotype, female (US) and paratype female, Malakal I., Palau Is., May 2, 1957, Sabrosky; paratype female, Koror, Palau Is., limestone ridge, Apr. 26, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

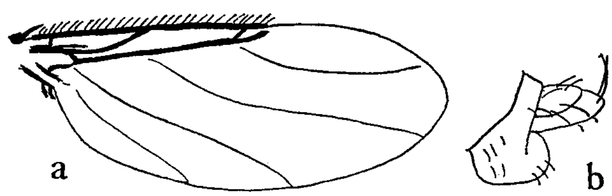
Although there are four well-preserved females and the only male has the abdomen missing, I prefer to select this male as the type, as the male is much easier to recognize on account of its scarcely bristled, swollen palpi, a character not known in any other species of Micronesian *Megaselia.*

In Brues' key to the *Megaselia* of the Philippines [1936, Am. Acad. Arts Sci., Proc. **70** (9) : 372] the species runs to *M. apposita* Brues from which it is easily distinguished by its normally produced anal angle of wing and other particulars. The same character serves to distinguish *M. palpella* from all species of *sauteri* group.

**18. Megaselia (Megaselia) gressitti** Beyer, n. sp. (fig. 11).

A member of *sauteri* group, rather difficult to distinguish from its allies. Front subquadrate; antennae yellowish, not enlarged in male; palpi with normal bristle in both sexes; second transverse row of reclinate frontals consisting of equidistant bristles (in contrast to *M. curtissima*). Fore tarsi not enlarged in male, hind tibiae with dorsal hair seam straight. Costal section 1 scarcely shorter than 2, costal cilia short, but not so minute as in *curtissima*. Halteres black. Tergite 2, and in female usually also 6, strikingly yellow, contrasting with remainder of abdomen. Tergite 6 of normal shape.

*Female:* Front subquadrate, not very convex anteriorly, sides parallel, median length scarcely or not greater than width, 0.32 : 0.30 mm. Surface dullish, black, with a distinct brownish base color showing through, anterior margin sometimes pale brownish; whole surface rather pollinose. Ocellar tubercle black, well defined, raised. Median impressed furrow distinct, shining. Fine hairs small and delicate, inconspicuous. All frontal bristles stout. Four unequal supra-antennals, upper pair occupying about one-fourth width of front; lower postantennals much closer together, only half as thick as upper. First transverse row of reclinate frontals distinctly convex anteriorly, antials set close to upper margin of antennal grooves and equally close to anterolaterals, which stand on a slightly higher level than upper supra-antennals. Second transverse row only a little convex, its bristles equidistant, innermost ("preocellars" of Schmitz; Brues terms all four bristles of this row "preocellars" or "bristles of the preocellar row") a little farther apart than upper supra-antennals (6 : 5). Mediolateral bristle midway between first and third bristles. Antennal segment 3 yellowish, of usual size, rounded with a slight apex, 1.5 times longer than frontal height, 0.48 mm., well pubescent. Palpi bright yellow, much paler than antennae, of normal shape and size. Distal two-thirds of ventral margin with about 10 bristles arranged in two rows; basal ones of outer series very short and more hairlike



a b

FIGURE 11.—*Megaselia gressitti:* **a**, wing; **b**, male genitalia.

than bristlelike, bristles of inner row moderate-sized, and only three or four distal ones of outer series thick and longer than remaining ones; all bristles become gradually longer toward apex, end bristle a bit differentiated, 0.11 mm. (not to scale, as taken from a dried specimen *in situ*).

Thorax with pleura and scutellum reddish yellow. Mesonotum not shiny, pleura shining. Fine hairs on dorsum a little stouter and longer before two-bristled scutellum, but no real bristles between two dorsocentrals. Propleura with three small bristles near lower hind corners and three below thoracic stigma; mesopleura entirely bare.

Wing (fig. 11, *a*) with membrane definitely tinged with gray; length 1.82 mm., maximum width 0.70 mm. Costa not thickened, much extended past middle of wing, index 0.56. Ratios of costal sections 24 : 27 : 7, thus section 1 a bit shorter than 2 plus 3. Costal cilia numerous and densely placed, short, but not as tiny as in *M. curtissima*, n. sp., 0.48 mm. long. Fork a little acute-angled, but not to such a degree as in *M. suis* Bohart, lumen not prominent. Vein $M_1$ arising just beyond fork, faintly S-shaped at immediate base, then fairly well curved, becoming more even and less convex distally, then again

more bent anteriorly, not recurved at tip. Ratios of distances between extreme tips of veins $M_1$, $M_2$, $M_4$, and A, 19:37:27. Anal veins well pigmented; anal angle not developed, retracted as in all members of *sauteri* group. Halteres black, stem yellowish.

Legs, including all coxae, yellow; hind femora darkened at tip. Fore tibiae without any isolated cilia. Fore tarsi normal, slim. Hind femora not particularly broadened, widest near middle; length 0.82 mm., maximum breadth 0.256 mm., first half of ventral margin beset with a series of about 12 small, hairlike, apically curved bristles, 0.062 mm. long. Hind tibiae with dorsal hair seam quite straight; posterodorsal cilia weakly developed in proximal fifth of tibia, thence about 11 stronger and noticeably more visible setulae.

Abdomen widest at end of segment 2, with six dorsal plates, none modified; tergite 1 black at sides, light brownish medially, but rather varying in color; tergite 2 strikingly yellow, rarely with a brownish macula in middle; tergites 3 to 5 black, but to a more or less degree with crescentic yellowish spots in middle, these are often triangular in shape, widening toward yellow hind margins; tergite 6 yellow, but mostly not as strikingly as 2. Tiny hairs of dorsal plates a little longer and more visible at sides and along hind margins, tergite 2 with a conspicuous tuft of bristles laterally. Venter yellow-brown, with minute scattered hairs beyond segment 5. Postabdominal segments weakly chitinized, dark, cerci and segment 9 yellow.

*Male:* Similar to female; even bristles along ventral margin of hind femora not longer than in female. Abdominal tergite 6 (in two specimens before me) dark-colored. Hypopygium (fig. 11, *b*) rather large, knoblike, protruding, probably symmetrical; in specimens at hand, right hypopygial side concealed; when seen from left, epandrium black with a faint brown base color, dull, set with a few very tiny, partly curved hairs, arranged as shown in fig. 11, *b*. Anal tube as long as epandrium when seen in lateral view, not stout, deep yellow; end hairs well differentiated.

Length of body 1.5-1.7 mm.

Holotype, male (US 67407), Chol, Map I., Yap, June 19, 1957, Sabrosky; allotype, female (US), Dugor, Weloy, Yap I., June 15, 1957, Sabrosky. Paratypes: Male, female, Rumung, Yap I., June 17, 1957; paratype, female, same locality, June 15, 1957; all by Sabrosky.

DISTRIBUTION: Caroline Is. (Yap).

This species is named in honor of J. L. Gressitt, B. P. Bishop Museum, Honolulu.

### Genus **Metopina** Macquart

*Metopina* Macquart, 1845, Hist. Nat. Dipt. **2**: 666 (type species: *Phora galeata* Haliday, Europe).

### Subgenus **Metopina** Macquart

*Leptophora* Six, 1878, Tijdschr. Ent. **21**: 186.
*Drepanophora* Strobl, 1880, Progr. Seitenstetten **14**: 40, nec Loew, 1869.
*Comfurcula* Schmitz, 1927, Natuurhist. Maandblaad **16**: 23.

19. **Metopina (Metopina) ventralis** Schmitz.

*Metopina ventralis* Schmitz, 1927, Zool. Anzeiger **74** (11/12): 245, fig. 3 (type, Bismarck Archipelago, possibly in Schmitz collection).

DISTRIBUTION: Bismarck Archipelago, Hawaii, Caroline Is.

PONAPE. Female, Mt. Temwetemwensekir, 180 m., Jan. 1953, Gressitt.

## Genus **Puliciphora** Dahl

*Puliciphora* Dahl, 1897, Zool. Anzeiger **20**: 409 (type species: *Puliciphora lucifera* Dahl, Bismarck Archipelago).

### Subgenus **Puliciphora** Dahl

*Stethopathus* Wandolleck, 1898, Zool. Jahrb., Abt. Syst., 424.
? *Pachyneurella* Brues, 1903, Am. Ent. Soc., Trans. **29**: 382.
*Myrmomyia* Silvestri, 1911, Lab. Zool., Portici, Bol. **5**: 175.
*Termitophora* Schmitz, 1913, Ent. Medd. **10**: 9.
*Parapuliciphora* Santos, 1921, Acad. Barcelona, Mem. III, **17**: 73.

### Key to Micronesian Species of Puliciphora

1. Female ........ 2
   Male ........ 4
2. 10 frontal bristles ........ **21. lucifera**
   14 frontal bristles ........ **23. wymani**
   16 frontal bristles ........ **20. pulex**
   12 frontal bristles ........ 3
3. Entire abdominal tergite 5 dark and evidently chitinized ........ sp. no. 1
   Only flap of abdominal tergite 5 dark, remainder of plate whitish ........ **22. pallicauda**
4. Four scutellar bristles ........ **23. wymani**
   Two scutellar bristles ........ several species

Except for *P. wymani*, it is not possible to determine the males of the Micronesian *Puliciphora* at present. There are several males at hand; some clearly belong to *P. pulex*, others represent probable new species. More abundant material must be awaited to clarify this.

**20. Puliciphora (Puliciphora) pulex** Dahl.

*Puliciphora pulex* Dahl, 1897, Zool. Anzeiger **20** : 186 (type, Bismarck Archipelago, in Mus. Naturkunde, Berlin).

*Puliciphora pusillima* de Meijere, 1912, Zool. Jahrb., Suppl. XV, **1** : 149, figs. 16-18.

*Puliciphora nigriventris* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205) : 412, figs. 42, 43.

DISTRIBUTION : Bismarck Archipelago, Sumatra, Caroline Is.

PALAU. Peleliu : Female, three males (CM), at light, Aug. 1945, Dybas.

KUSAIE. Two females, Mutunlik, 22 m., in cheese-baited traps, Jan. 1953, Clarke; females, same data except Mar. 1953, Clarke.

**21. Puliciphora (Puliciphora) lucifera** Dahl.

*Puliciphora lucifera* Dahl, 1897, Zool. Anzeiger **20** : 410 (type, Bismarck Archipelago, in Mus. Naturkunde, Berlin).

*Stethopathus ocellatus* Wandolleck, 1898, Zool. Jahrb., Abt. Syst. **11** : 441.

DISTRIBUTION: Bismarck Archipelago; Fiji (after Brues); Samoa (after Malloch); Hawaii; Marshall Is., Caroline Is.

PONAPE. About 15 females, Colonia, Agric. Expt. Sta., Jan. 1953, Gressitt.

KUSAIE. Female, Mutunlik, 22 m., in cheese-baited trap, Jan. 1953, Clarke.

MARSHALL IS. JALUIT: Female, Jabwar I., fly trap, carrion excrement, May 1958, Gressitt.

22. **Puliciphora (Puliciphora) pallicauda** Schmitz.

*Puliciphora pallicauda* Schmitz, 1934, Natuurhist. Maandblaad **23** (11): page not known to me (type, Java, probably in Schmitz collection).

DISTRIBUTION: Java, Caroline Is.

PALAU. KOROR: Three females, on decaying African snail, May 1957, Sabrosky. PELELIU: Ngerkabesang, on decaying African snail, May 1957, Sabrosky.

*P. pallicauda* was hitherto known only from a single female from Java. The holotype was found in a nest of *Termes javanicus* Holmgren, but the present specimens are labeled "on decaying Giant African Snail."

The specimens at hand fit Schmitz's original description very well.

23. **Puliciphora (Puliciphora) wymani** Bohart.

*Puliciphora wymani* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205): 411, figs. 44, 45 (type, Guam, in U. S. National Museum).

DISTRIBUTION: Hawaii, S. Mariana Is., Caroline Is.

S. MARIANA IS. GUAM: Pt. Oca, June and Dec. 1945 (after Bohart); no new records.

YAP. YAP: 1952, Krauss.

**Puliciphora (Puliciphora)** sp. no. 1.

DISTRIBUTION: Caroline Is.

KUSAIE. Female, Mutunlik, 22 m., in cheese-baited traps, Jan. 1953, Clarke.

There is one female of an apparently new *Puliciphora* which I prefer not to name at present. It is related to *beckeri* de Meijere from Java having, like that species, only 12 frontal bristles. The fifth abdominal tergite is, however, strongly reduced in *beckeri,* thus the anterior margin of the semicircular flap is not much shorter than that of the fore margin of the whole tergite.

## Genus **Chonocephalus** Wandolleck

*Chonocephalus* Wandolleck, 1898, Zool. Jahrb., Abt. Syst. **11**: 428 (type species: *C. dorsalis* Wandolleck, Bismarck Archipelago).

*Heterophora* Santos, 1921, Acad. Barcelona, Mem. **17** (1): 81.

There are at least three *Chonocephalus* species in the material at hand. Unfortunately, however, Bohart's descriptions and illustrations of *subglaber* and *hirsutus* are quite inadequate, so the *Chonocephalus* must remain undetermined.

24. **Chonocephalus hirsutus** Bohart, sp. inc.
*Chonocephalus hirsutus* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205) : 409, figs. 41, 48 (type, Guam, in U. S. National Museum).
DISTRIBUTION: S. Mariana Is.

25. **Chonocephalus subglaber** Bohart.
*Chonocephalus subglaber* Bohart, 1947, U. S. Nat. Mus., Proc. **96** (3205) : 410, figs. 40, 47 (type, Guam, in U. S. National Museum).
DISTRIBUTION: S. Mariana Is.